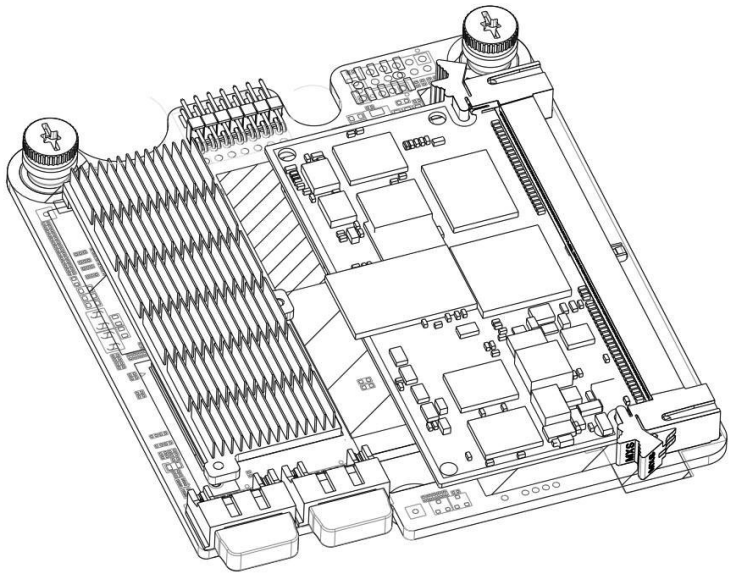
Overview



The HP Smart Array P712m mezzanine card is the preferred high value solution for 6Gb/s Shared SAS Storage for the HP ProLiant BladeSystem servers. It is one of the highest performing controllers in the SAS portfolio and provides new levels of reliability for the HP BladeSystem through its support of the latest SCSI technology and advanced RAID capabilities. Supports up to 4 P2000 Smart Arrays.

What's New

- 256 Cache
- Support for 6 Gb/s SAS
- Support for 6G SAS Switch
- 2 internal SAS 1x ports and 2 external SAS 2x ports
- Support for externally attached Shared storage
- Support for Internal SATA/SSD drives on BL280c, BL490c, and BL495c

Models

HP Smart Array P712m/ZM 2-ports Int PCIe x8 SAS Controller	484299-B21
HP Smart Array P712m/256 6Gb 2-ports Int/2-ports Ext Mezzanine SAS Controller	488348-B21

NOTE: In order to support SAS Hard Drives the server blade must have a P712m Controller installed in server mezzanine slot 1 or mezzanine slot 2.

Standard Features

The Smart Array Advantage

HP's innovative design and integration work within the Smart Array family of products creates customer value that is unmatched in the industry. Use of Smart Array products across multiple applications results in a much lower Total Cost of Ownership (TCO) than any other server storage RAID product. The HP Smart Array family brings an unparalleled return on investment.

Data Compatibility. Data Compatibility with all Serial Smart Array controllers allows simple and easy upgrades any time needs for higher performance, capacity, and availability increase.

Consistent Configuration and Management Tools. All Smart Array products utilize a standard set of management and utility software. These tools minimize Total Cost of Ownership (TCO) by reducing training requirements and technical expertise necessary to install and maintain HP server storage.

Pre-Failure Warranty. Pre-Failure Warranty means Systems Insight Manager not only reports when a drive is going to fail but allows replacement of failing drives prior to actual failure. For complete details, consult the HP Support Center or refer to your HP Server documentation.

Key Features

- Storage interface (SAS/SATA)
  - 6 Gb/s SAS technology delivers up to 600 MB/s per physical link.
  - 3 Gb/s SATA technology delivers up to 300 MB/s for directly attached SATA drives.
  - Mix-and-match SAS and SATA drives. Deploy drive technology as needed to fit the computing environment.
  - Support for SAS tape drives, SAS tape autoloaders and SAS tape libraries.
- RAID controller features
  - 256 MB cache
  - RAID 0, 1
  - RAID 0, 1, 3, 5, 6, 10, 50 on P2000 G3 SA (for shared storage)
    NOTE: RAID for Shared Storage is controlled by the controller of the array.
  - Recovery ROM protects against ROM corruption.
- Smart Array PCIe mezzanine card that connects to a HP 6Gb/s SAS BL Switch through the c-Class enclosure high-speed mid-plane supporting shared SAS storage.
- Four (4) 6Gb/s SAS physical links distributed across 2 external 2x ports to supports up to 2 6Gb/s SAS Switches
- Two (2) 6Gb/s SAS physical links distributed across 2 internal 1x ports to support up to 2 6Gb/s SAS HDDs
- Software consistency among all Smart Array family products: Array Configuration Utility, Systems Insight Manager, Array Diagnostic Utility (ADU) and SmartStart

Online Management Features

- Online array expansion (with cache)
- Online logical drive extension (with cache)
- Online RAID level migration (with cache)
- Online strip size migration (with cache)
- User selectable rebuild priority
- User selectable RAID level and stripe size

Standard Features

HP P2000 G3 Modular Smart Array Systems

Online Management Features:

HP Storage Management Utility (SMU).

- Management access, out-of-band:
  - WEB GUI, CLI.
- Interface Types:
  - USB, 10/100 Ethernet.
- Protocols Supported:
  - SNMP, SMI-S, SSL, SSH, SMTP, FTP, HTTP, Telnet

P2000 G3 Smart Array Systems - RAID 0, 1, 3, 5, 6, 10, 50:

In addition to the usual RAID levels, the P2000 G3 features several important additional levels. RAID 6 is the highest level of RAID protection. It allocates two sets of parity data across drives and allows simultaneous write operations. It can withstand two simultaneous drive failures without downtime or data loss. RAID 10 is mirroring and striping without parity. It is the most popular of the multiple RAID levels, allowing large arrays with high performance in most cases and superior fault tolerance. RAID 50 combines the block striping and parity of RAID 5 with the straight block striping of RAID 0, yielding higher performance than RAID 5 through the addition of RAID 0, particularly during writes.

Performance

- 6Gb/s SAS (600MB/s bandwidth per physical link)
- 256 MB Cache available (256 MB cache enables use of the external ports)

Capacity

- Dependent upon attached arrays. See drive enclosure QuickSpecs for details.

Availability

Provides increased server uptime by providing advanced storage functionality:

- Online RAID Level Migration (0,1)
- Pre-Failure Warranty

NOTE: This is not applicable for P2000.

Fault Prevention

The following features offer detection of possible failures before they occur, allowing preventive action to be taken:

- S.M.A.R.T.: Self Monitoring Analysis and Reporting Technology first developed at HP detects possible hard disk failure before it occurs, allowing replacement of the component before failure occurs.
- Drive Parameter Tracking monitors drive operational parameters, predicting failure and notifying the administrator.
- Dynamic Sector Repairing continually performs background surface scans on the hard disk drives during inactive periods and automatically remaps bad sectors, ensuring data integrity.
- Smart Array Cache Tracking monitors integrity of controller cache, allowing pre-failure preventative maintenance.

Standard Features

Fault Tolerance RAID Descriptions	Keeps data available and server running while a failed drive is being replaced; two fault tolerance configurations are supported for the internal connections including: • RAID 0 (striping) provides no extra data protection. Data is striped across all drives in the array to increase performance. RAID 0 requires a minimum of one drive. • RAID 1 (mirroring) protects against failure of one drive. Data is duplicated on a pair of drives. RAID 1 requires a minimum of two drives. NOTE: Please see the HP P2000 G3 Modular Smart Array Systems QuickSpecs for Technical Specifications and additional information regarding RAID levels: http://h18000.www1.hp.com/products/quickspecs/13551_na/13551_na.html
Fault Recovery	Minimizes downtime, reconstructs data, and facilitates a quick recovery from drive failure: • Recovery ROM: This feature provides unique redundancy that protects from a ROM image corruption. A new version of firmware can be flashed to the ROM while the controller maintains the last known working version of firmware. If the firmware becomes corrupt, the controller will revert back to the previous version of firmware and continue operating. This reduces the risk of flashing firmware to the controller. • DRAM ECC corrects against single bit data and address corruption.
Ease of Use	Consistency and Upgradeability make the Smart Array family unique in the industry: • GUI based configuration, management and diagnostic software tools • Common data format between generations of products

Compatibility

Supported Servers	HP ProLiant BL280c G6 HP ProLiant BL460c G7 HP ProLiant BL465c G7 HP ProLiant BL490c G7 HP ProLiant BL490c G7 HP ProLiant BL495c G5 HP ProLiant BL495c G6 NOTE: For more information on internal vs external connections, please refer to proper blade QuickSpecs
Operating Systems and Virtualization Software Support for ProLiant Servers	Microsoft Windows 2003 Microsoft Windows 2008 R2 SLES 10 SP3 SLES 11 SP1 Red Hat Enterprise Linux 5 Red Hat Enterprise Linux 6 VMware ESX 4.0 VMware ESX 4.1 NOTE: For more information on HP's Certified and Supported ProLiant Servers for OS and Virtualization Software and latest listing of software drivers available for your server, please visit our Support Matrix at: http://www.hp.com/go/supportos.
Software Suite	All Smart Array products share a common set of configuration, management and diagnostic tools, including Array Configuration Utility, Array Diagnostic Utility (ADU), and Systems Insight Manager. This software consistency of tools reduces the cost of training for each successive generation of product and takes much of the guesswork out of troubleshooting field problems. These tools lower the total cost of ownership by reducing training and technical expertise necessary to install and maintain HP server storage.
Systems Insight Manager	• Powerful server and server options/storage manager tool • Monitors over 1200 system wide parameters • Configuration/Diagnostic Utilities
HP Array Configuration Utility (ACU)	• Powerful Web based configuration utility for all Smart Array controllers • Provides a graphical view of HP server drive array configurations • Allows for management of multiple arrays over a secure internet connection from anywhere in the world • Easy to use Wizards for configuration • Runs offline (via Smart Start) and online on Windows
HP Option ROM Configuration for Arrays (ORCA)	• An alternative method for easily viewing, creating, and deleting multiple arrays and logical volumes during system power up. • For advanced array configurations use ACU
HP Storage Management Utility	• Initial System Configuration Wizard is the easiest and simplest method for configuring the storage system initially. • Command Line Interface (CLI) for command level method of

Compatibility

	configuring and managing the storage • Main User Interface for multi server environments that need customization for creation of storage Luns and targets. • P2000 G3 Arrays can be configured using Storage Management Utility (SMU) or Command Line Interface (CLI) both of which are embedded in the P2000 G3 Array controller firmware.
HP Array Diagnostic Utility (ADU)	• In depth diagnostic and reporting utility for all Smart Array controllers

Service and Support, HP Care Pack, and Warranty Information

Warranty	The warranty for this device is 3 years parts only. Pre-Failure Warranty: Drives attached to the Smart Array Controller and monitored under Insight Manager are supported by a Pre-Failure (replacement) Warranty. For complete details, consult the HP Support Center or refer to your HP Server Documentation.
Software Product Services	Standalone telephone support Rights to new license version Media and documentation updates
Hardware Product Services	Installation services On-site maintenance (includes warranty support) Response time upgrades during the warranty period Post-warranty coverage RAID setup and performance consulting via statement of work
Warranty Upgrade Options	Response - Upgrade on-site response from next business day to same day 4 hours Coverage - Extend hours of coverage from 9 hours x 5 days to 24 hours x 7 days Duration - Select duration of coverage for a period of 1, 3, or 5 years Warranty upgrade options can come in the form of Care Packs, which are sold at the HP System level this product attaches too.
HP Care Pack Information	HP Care Pack is defined as an upgrade to the product warranty attribute, available for a specific duration and hours of coverage. Care Packs for this option is sold at the system level this option attaches too. HP Care Pack is not available for less than the product's warranty duration. HP Care Pack is available for sale anytime during the warranty period for most products, but the commencement date will be the same as the Warranty Start Date (delivery date to end user customer). Proof of purchase may be required. HP Care Pack services are prepaid. NOTE: For additional HP Care Pack (hardware & software) information, as well as orderable part numbers, please refer to the URL: http://www.hp.com/hps/carepack/

Options

HP Hard Drives	NOTE: Supports attached enclosures.	
	P2000 Large Form Factor (LFF) SAS drives for P2000 G3 FC and P2000 3.5-inch Disk Enclosure	
	HP P2000 300GB 6G SAS 15K rpm LFF Dual Port Enterprise Hard Drive	AP858A
	HP P2000 450GB 6G SAS 15K rpm LFF Dual Port Enterprise Hard Drive	AP859A
	HP P2000 600GB 6G SAS 15K rpm LFF Dual Port Enterprise Hard Drive	AP860A
	P2000 Large Form Factor (LFF) SAS MDL DP drives for P2000 G3 FC and P2000 3.5-inch Disk Enclosure	
	HP StorageWorks P2000 1TB 6G SAS 7.2K LFF (3.5-inch) Dual Port MDL Hard Drive	AP861A
	HP StorageWorks P2000 2TB 6G SAS 7.2K LFF (3.5-inch) Dual Port MDL Hard Drive	AW555A
	MSA2 Large Form Factor (LFF) SATA drives for P2000 array head an P2000 disk enclosure	
	HP StorageWorks MSA2 1TB 7.2K rpm 3.5 inch Dual-port SATA Hard Disk Drive	AJ740A
	HP StorageWorks P2000 2TB 3G SATA 7.2K LFF MDL Hard Drive	AW556A
	SAS Hot Plug SFF (2.5-inch) Enterprise (ENT) Drives	
	NOTE: Supports P2000 G3 Array (24 drive bay) and the D2700 JBOD (25 drive bay).	
	HP 146GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	507125-B21
	HP 300GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	507127-B21
	HP 450GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	581284-B21
	HP 600GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	581286-B21
	HP 72GB 6G SAS 15K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	512545-B21
	HP 146GB 6G SAS 15K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	512547-B21
	NOTE: Please see QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12244_na/12244_na.html	
	SAS Hot Plug SFF (2.5-inch) Midline (MDL) Drives	
	NOTE: Supports P2000 G3 Array (24 drive bay) and the D2700 JBOD (25 drive bay).	
	HP 500GB 6G SAS 7.2K rpm SFF (2.5-inch) Dual Port Midline 1yr Warranty Hard Drive	507610-B21
	NOTE: Please see QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12244_na/12244_na.html	
	SATA Hot Plug SFF (2.5-inch) Midline (MDL) Drives	
	NOTE: SFF SATA drives are single ported and therefore do not have a fail-over path intrinsic to their design.	
	NOTE: Supports P2000 G3 Array (24 drive bay) and the D2700 JBOD (25 drive bay).	
	HP 500GB 3G SATA 7.2K rpm SFF (2.5-inch) Midline 1yr Warranty Hard Drive	507750-B21

Options

NOTE: Please see the QuickSpecs for Technical Specifications and additional information:
http://h18000.www1.hp.com/products/quickspecs/13021_na/13021_na.html

HP P2000 G3 Modular Smart Array Systems	**P2000 G3 SAS Controller**	
	HP StorageWorks P2000 G3 SAS MSA Array System Controller (four 6Gb SAS ports per controller)	AW592A
	P2000 Chassis	
	P2000 Controller-less Chassis (AC-powered)	
	HP StorageWorks P2000 Modular Smart Array 3.5-in Drive Bay Chassis (LFF) NOTE: Will accept one or two controllers or Disk Enclosure I/O modules.	AP838A
	HP StorageWorks P2000 Modular Smart Array 2.5-in Drive Bay Chassis (SFF) NOTE: Will accept one or two controllers, not I/O modules.	AP839A
	Configured Units, 6 Gb SAS Systems	
	HP StorageWorks P2000 G3 SAS MSA Dual Controller LFF Array System	AW593A
	HP StorageWorks P2000 G3 SAS MSA Dual Controller SFF Array System	AW594A
	Disk Enclosures	
	HP StorageWorks P2000 Dual I/O LFF Drive Enclosure, twelve 3.5" drive bays (w/ two .5m mini-SAS to mini-SAS cables. Used with single or dual controller LFF or SFF array head)	AP843A
	HP StorageWorks P2000 LFF Drive Enclosure I/O Module (no cable included. Designed exclusively for use with the LFF chassis AP838A to create a single I/O JBOD)	AJ844A
	HP StorageWorks D2700 SFF Disk Enclosure, twenty-five 2.5" drive bays (w/ two .5m mini-SAS to mini-SAS cables. Used with single or dual controller LFF or SFF array head)	AJ941A
HP Tape Backup	**Tape Autoloaders**	
	HP StorageWorks 1/8 G2 LTO-4 Ultrium 1760 SAS Tape Autoloader	AK377A
	HP StorageWorks 1/8 G2 LTO-5 Ultrium 1760 SAS Tape Autoloader	BL536A
	HP StorageWorks 1/8 G2 LTO-3 Ultrium 920 SAS Autoloader	AH558A
	Tape Libraries	
	HP StorageWorks MSL2024 1 LTO-4 Ultrium 1760 SAS Drive Library	AK378A
	HP StorageWorks MSL2024 1 LTO-3 Ultrium 920 SAS Drive Library	AH559A
	HP StorageWorks MSL2024 1 LTO-5 Ultrium 3000 SAS Drive Library	BL537A
	HP StorageWorks MSL4048 2 LTO-4 Ultrium 1760 SAS Drive Library	AK380A
	HP StorageWorks MSL2048 1 LTO-5 Ultrium 3000 SAS Drive Library	BL538A
	HP StorageWorks MSL8096 2 LTO-4 Ultrium 1760 SAS Drive Library	AK382A
	HP StorageWorks MSL8096 2 LTO-5 Ultrium 3000 SAS Drive Library	BL539A
	NOTE: HP recommends a maximum of 2 tape drives per 6Gb/s SAS BL Switch and 64K transfer sizes. Attaching a library with 4 tape drives requires purchasing a second tape library SAS cable (AN975A or AN976A) and attaching 2 drives to the redundant 6Gb/s SAS BL Switch. Attaching more than 2 tape drives per switch and transfer sizes greater than 64K could result in a failed backup or restore. A future release of firmware on the tape library drives will allow more than 2 tape drives to be attached to a switch.	

Technical Specifications

Dimensions	4 in x 4.5 in x 0.8 in (10.1 cm x 11.4 cm x 2 cm)
Disk Drive and Enclosure Protocol Support	SAS protocol: 6Gb/s, 3Gb/s, or 1.5Gb/s SATA protocol: 3Gb/s or 1.5Gb/s
SAS Connectors	two (2) 1x connectors for cabled drives, two (2) 2x connections for external connection to SAS switch
Memory Bus Speed	DDR2-800MHz and 40-bit wide bus (256MB module)
SAS Port Link Rate	6Gb/s per physical link
Software Upgradeable Firmware	Yes
Cache Memory	256 MB Read/Write ECC protection and removable
Logical Drives Supported	Up to 2 logical drives internal, 512 logical drives external
Maximum Capacity	Variable depending upon enclosure
Memory Addressing	64-bit, supporting servers memory space greater than 4 GB
RAID Support	Internal drives support RAID 0 (Striping) and RAID 1 (Mirroring) RAID 0, 1, 3, 5, 6, 10, 50 on P2000sa
Upgradeable Firmware	Flashable ROM with redundant firmware images

Environment-friendly Products and Approach	End-of-life Management and Recycling	Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: http://www.hp.com/go/green. To recycle your product, please go to: http://www.hp.com/go/green or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/green. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

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For hard drives, 1GB = 1 billion bytes. Actual formatted capacity is less.